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**NON-LETHAL WEAPONS: FORCE ENABLER FOR THE
OPERATIONAL COMMANDER CONDUCTING PEACE OPERATIONS**

by:

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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ABSTRACT

Conducting peace operations is a recurring mission of the United States military. To carry out this function, the Task Force Commander must be afforded a wide array of alternative response methods to implement in the field. Since non-lethal weapons can be employed at the lower end of the force continuum, the commander can more rapidly counter evolving threat situations, retain the initiative, and reduce the vulnerability of his soldiers. Without non-lethal weapons, the commander is faced with the uneasy decision of either doing nothing, or killing somebody. Failing to quickly respond could get his forces hurt, while an overly aggressive response using lethal force could forfeit the legitimacy of the operation.

Non-lethal weapons offer a critical interim step for the commander to employ before resorting to lethal force. Capable of delivering a varying level of effects, non-lethal weapons response levels can ratchet up or down along the force continuum in direct relationship to the intensity of the perceived threat.

Introduction

When the Soviet Union dissolved, for the most part, so did the threat of a global war between the Super Powers. Instead, the world menace shifted toward regional Small Scale Conflicts (SSCs) and Military Operations Other Than War (MOOTW). Now the United States military finds itself conducting humanitarian activities, peacekeeping missions, and combat operations all within the same geographic area, sometimes all on the same day.¹ To be successful while performing these complicated peace operations, our military must be afforded an interim step to use between verbal warnings and deadly force.² Non-lethal weapons (NLW) can fill this void. Outfitted with NLW, our forces can reduce tensions, control potentially explosive events, and minimize casualties among innocent civilians.³ But during the performance of these complicated peace operations, how can the U.S Military employ non-lethal weapons and avoid loss of legitimacy in the process?

Generally, "peace operations" are a type of MOOTW designed to support political and diplomatic efforts to reach a long-term political settlement.⁴ "Military support improves the chances for success in the peace process by lending credibility to diplomatic actions and demonstrating resolve to achieve viable political settlements."⁵ Peace operations are not wars, although combat may be required to quell conflict, violence, and disorder. The enemy in a peace operation is the dispute, not the belligerents.

Peace operations are subdivided into two very different roles, "peacekeeping" and "peace enforcement." Peacekeeping is undertaken with the consent of all major parties of a dispute and is designed to monitor and facilitate implementation of an agreement, such as a cease-fire or a truce. In contrast, peace enforcement uses (or threatens to use) military force to *compel* compliance with the resolutions designed to maintain or restore order. Peace

enforcement does not require the consent of the states involved in the conflict.⁶ Attempts to shift duty back and forth between the two categories often create confusion. This “mission creep,” or unintended expansion of the mission without prior deliberate planning, is best illustrated by the failed United States actions in Somalia.⁷ Initially detailed to the country in a purely humanitarian capacity, American legitimacy suffered when our forces could not adequately respond to their rapidly evolving peace enforcement role.

So, what is meant by “legitimacy”? In MOOTW, legitimacy is a state of mind based on the assessment by a specific audience of the legality, morality, or rightness of a set of actions. If an operation is perceived to be legitimate, the populace will usually support it. If, on the other hand, the operation is perceived as illegitimate, it will be fiercely resisted. Non-lethal weapons can bolster United States legitimacy abroad by allowing the military to perform peacekeeping duties without immediately resorting to the “iron fist” use of deadly force.

In this report, I will not address blinding lasers, hallucinogens, calumative agents, and most biologic agents (biodegrading organisms). I believe these devices are, or most likely will be, declared illegal by international law. Also, some of the weaponry discussed later, such as electromagnetic pulse (EMP) and acoustic devices are still in the experimental phase of development.

Non-lethal Weapons

Unlike conventional lethal weapons that destroy their targets principally by blast, penetration, or fragmentation; non-lethal weapons employ means other than gross physical destruction to prevent the target from functioning.⁸ NLW are explicitly designed, and primarily employed, to incapacitate personnel or materiel while minimizing fatalities,

permanent injuries to personnel, and undesired collateral damage to property and the environment.⁹ They cover a wide spectrum of designs, functions, and applications, all of which are intended to have relatively reversible effects (see Appendix A). However, NLW are not required to have a “zero” probability of causing fatalities or permanent injuries. For this reason, other titles, such as “disabling,” “less-than-lethal,” “pre-lethal,” “soft kill,” and “low-collateral,” are also used to describe non-lethal weapons.

The Legal Framework

The domestic legal authority that allows American forces to participate in peace operations is founded in the United States Constitution and the United Nations (UN) Charter. The Constitution gives the President independent legal authority to deploy United States forces in support of peace operations. He is exclusively responsible for the “conduct of diplomatic affairs and has the power to dispose of troops and equipment in such a manner and on such duties as best to promote the safety of the country.”¹⁰ The UN Charter was ratified by the President under the treaty clause of the United States Constitution, with the advice and consent of the Senate. It composes Federal law and provides domestic legal authority for the United States to support peace operations authorized or directed by the UN.

The Law of Armed Conflict (LOAC) regulates the conduct of armed hostilities based on international customs and agreements. Three overriding principles guide the LOAC. First, “military necessity” allows a belligerent to apply force to achieve its legitimate military objectives. Second, “proportionality” limits the degree of force used to the minimum necessary to perform legitimate military objectives. Proportionality acknowledges that all weapons can cause suffering, but states that any suffering must be balanced against military necessity. Third, “humanity” forbids the infliction of unnecessary suffering, superfluous

injury, or indiscriminate effects or destruction during the accomplishment of military operations.¹¹ Consequently, to meet the humanity principle, users must be able to direct their weapons at specific targets, rather than indiscriminately wiping out large segments of combatant and noncombatant populations or structures.

The Biologic Weapons Convention (BWC) barred the development, production, acquisition, or retention of biological agents or toxins unless they have justification for prophylactic, protective, or other peaceful purposes. Any weapon, equipment, or means of delivery designed to use such agents or toxins for hostile purposes was also declared illegal.¹²

The Chemical Weapons Convention (CWC) outlawed the use of riot control agents as a method of warfare. In spite of this, riot control gases and pepper sprays can be employed by the military during peacekeeping missions with National Command Authorities (NCA) approval.¹³ The CWC further stated:

Each State Party to this Convention undertakes never, under any circumstances: (a) To develop, produce, otherwise acquire, stockpile or retain chemical weapons, or transfer, directly or indirectly, chemical weapons to anyone; (b) To use chemical weapons; (c) To engage in any military preparations to use chemical weapons; (d) To assist, encourage or induce, in any way, anyone to engage in any activity prohibited to a state Party under this Convention.¹⁴

The Inhumane Weapons Convention (IWC) banned the use of weapons, lethal or not, that affect civilian populations. Additionally, the protocol prohibited the use and transfer of laser weapons specifically designed to cause permanent blindness to unenhanced vision. However, "blinding as an incidental or collateral effect of the 'legitimate military employment of laser systems' is not covered by the Protocol's prohibitions."¹⁵

Rules of Engagement

"Many factors influence rules of engagement (ROE) including national command

policy, mission, operational environment, commander's intent, and international agreements regulating conduct."¹⁶ ROE ensures that military operations are consistent with policy objectives by allowing civilian leaders to review the ROE and determine if it is too risky, violent, or would result in excessive collateral damage. Equally important, ROE provides the commander and his troops with a clear set of guidelines to follow in the field.

Developing operational ROE is an art and adding non-lethal weapons to the fray makes the task more challenging. Compounding the problem, ROE in MOOTW (as opposed to war) are more restrictive and sensitive to political concerns. Rules of engagement must be crafted to meet the principles of necessity and proportionality under the LOAC, and tailored to meet the specific needs of each mission. If the operational mission changes, then ROE must be reexamined and altered accordingly.¹⁷

Capabilities and Applications

The Law of Armed Conflict was the springboard for non-lethal weapons technology development since non-lethality—by definition—seeks to minimize fatalities and permanent disabilities.¹⁸ Additionally, NLW are politically attractive during peace operations "because they avoid military bloodletting that could strengthen enemy resolve and precipitate domestic/international censure."¹⁹

When a state is no longer functioning, peacekeepers would welcome non-lethal weapons as a tool to help them restore and maintain law and order with minimal force. NLW afford peacekeepers additional methods of own force protection, alternative courses of action in access denial functions, and a variety of options to try before resorting to deadly force in crowd control and riotous conditions.

In a force protection role, permanently installed acoustic weapons can defend fixed

installations such as embassy compounds or military barracks, where power considerations and equipment size requirements pose no constraints.²⁰ Electromagnetic pulse (EMP) or high-powered microwave “traps” installed at entrances to these vulnerable areas could be triggered remotely to disable terrorist vehicles before they enter the grounds. A simple can of pepper spray would enable a soldier to dissuade a belligerent individual, or a small group of people, before their actions escalate out of control. Moreover, EMP, laser, and acoustic devices offer good point defense protection for populations suffering from human rights abuses or genocide.²¹ Last, snipers who use noncombatants in crowds as human shields can be disabled and then captured with directed radiator lasers that temporarily dazzle, without permanently blinding them (see Figure 1). Being either broadband or wavelength-agile, these lasers are difficult to defeat with simple measures.²²

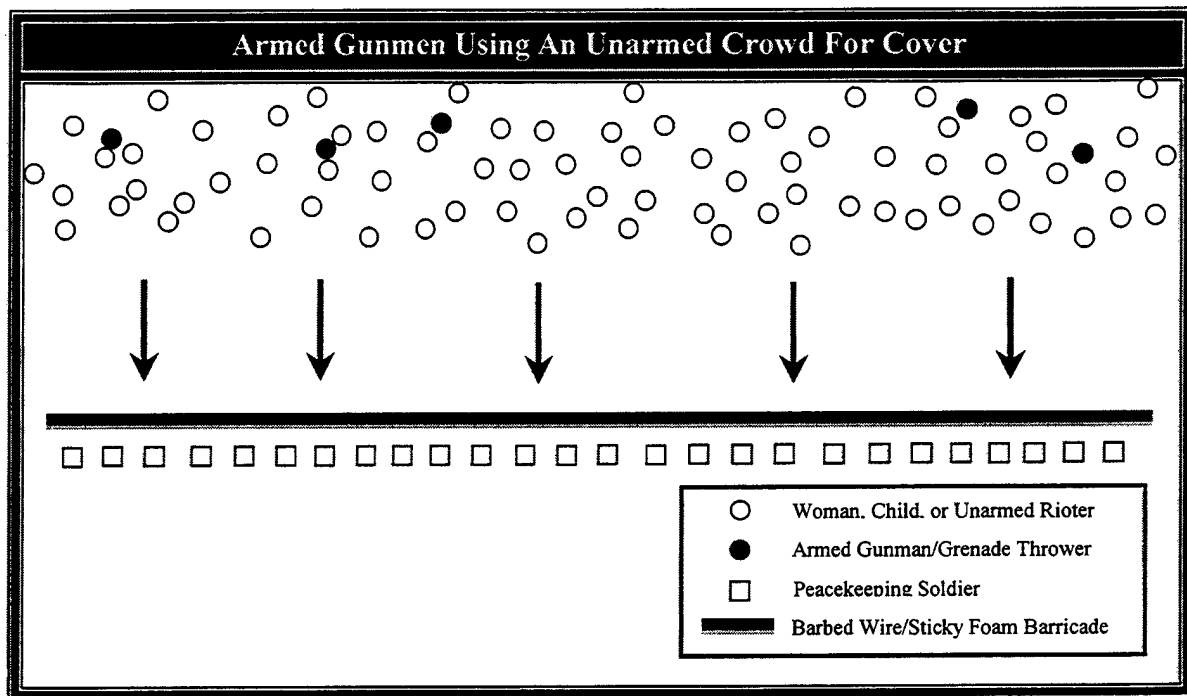


Figure 1²³

In access denial applications, “barricades” consisting of acoustic devices, foams, anti-traction, super adhesive, or odiferous chemicals can be profitably employed to separate

warring factions and stop the fighting. In this manner, non-lethal weapons could also simplify the evacuation of United States citizens from unfriendly soil and reduce the chances of fratricide.²⁴

In riotous conditions, troops could employ NLW to disperse crowds and deny them access to sensitive areas such as arsenals, power plants, and telecommunications centers. Riot control gases, pepper sprays, high-intensity noise, and water cannons can be used singularly or in concert with each other to help achieve order. Additionally, sting-balls, -rings, -grenades, and claymore sting-mines are very effective at discouraging "mob mentality" behavior by all but the most determined individuals. Those few remaining malcontents can be tackled individually with rubber bullets, entanglers, or conventional arms.

Limitations and Vulnerabilities

Non-lethal weapons have some drawbacks to consider. First and foremost, just about any gun can outdistance the relatively short effective ranges of NLW and put our forces at risk. Therefore, it is imperative that forces address the *lethal* threat first, even if it is significantly smaller than the non-lethal threat.²⁵ A soldier's basic right to self-defense is common to all ROE and NLW are intended to augment, not replace, his lethal weapons capabilities.²⁶

This leads us to another new dilemma. Some detractors fear that scenarios envisioning a mix of lethal and non-lethal weapons could overload ground troops unless completely separate NLW units are formed.²⁷ This would increase logistical burdens and divert money that might otherwise purchase, operate, and maintain traditional capabilities.

One more area of concern is complying with domestic and international law. This is bothersome for several reasons. First of all, policy limitations affect the implementation of

NLW. DoD Instruction 5000.2 specifies that United States weapons and munitions must undergo legal reviews during development, procurement, and deployment to ensure they conform to either the LOAC, or moral and ethical conventions. This can be a very protracted process. Corporations are reluctant to invest a lot of time and money to develop new technologies that may be held up in testing for years, and finally rejected in the end. The testing process must be streamlined before the only agency left developing new military technology is the military itself. Second, some NLW are relatively haphazard in their effects and may violate the humanity clause of the LOAC. Chemical technologies will attract the most attention here due to their historic indiscriminate effects.²⁸ The more noncombatants that are affected by a NLW, the greater the risk of unintended consequences. If the United States desires to maintain the moral "high ground," care must be taken to minimize these effects and constrain collateral suffering within the bounds of "military necessity." Third, there is a temptation to use electronic high voltage weapons for punishment, interrogation, or outright torture. International human rights agreements and national constitutions prohibit these acts as inhumane. ROE must take this into account, and our forces must be trained and monitored by their superiors to ensure we stay on the right side of the law. Finally, the mere mention of biological and chemical warfare weapons raises eyebrows among arms control specialists on Capitol Hill. Development of some NLW could jeopardize existing arms control agreements and conventions, and undermine efforts by the international community to prevent weapons proliferation.²⁹ Meeting the intent of international law must be carefully considered before any NLW is brought to bear in the field.

Another area of apprehension is the effect non-lethal weapons have on their target. There are risks involved in anti-personnel applications of NLW because people have been

killed or permanently disabled from rubber bullets, incapacitating gases, and electronic stun guns. Further, Optical non-lethal weapons designed to dazzle and cause temporary disorientation in a subject may have unintended side effects. For example, high intensity strobe lights can produce seizures in people with epilepsy and low-intensity lasers can blind personnel wearing night vision goggles. What's more, portable microwave weapons, if incorrectly calibrated, could cook the internal organs of a victim. In addition, riot control agents (RCA) do not respect unit boundaries. If employed, RCA must be thoroughly coordinated with adjacent friendly units.³⁰ A final note on anti-personnel applications of NLW is the difficulty involved in making valid battle damage assessments (BDA). Creative calculations may be required to determine whether human targets bearing no visible scars are actually incapacitated rather than playing possum.³¹ In both material and personnel applications, NLW may have to be repeatedly applied as their effects wear off and the target becomes belligerent, or operational, once again.

Weapons designed for anti-material purposes may also have unintended anti-personnel effects. For example, an EMP designed to destroy electronic circuits in communications systems could corrupt the flight control systems of an aircraft in flight and cause it to crash. Super lubricants, adhesives, corrosives or caustic agents airdropped on vehicles or roadways would have detrimental effects on the flesh of the people standing there. Carbon fibers designed to short out power grids have unknown effects on respiratory systems if inhaled.³²

For access denial purposes, super lubricants or adhesives applied on roads will impede belligerents. But these "stick-um" or "slick-um" compounds must be of a non-volatile nature to prevent enemy forces from defeating the barriers with a simple match, and

causing environmental or collateral damage in the process. What's more, these materials are equally effective at blocking our own troops who may later need to transit the area. Thus, after their purpose is served, an environmentally friendly way to remove the substances from the road must be developed.

One more line of thinking is that NLW may actually speed us down the road to further aggression, rather than stopping us early. "Designed to avoid the heavy damage and casualties usually associated with conflict, non-lethal weapons could in fact make conflict more likely in certain circumstances by appearing to make it more palatable."³³ Politicians, it is feared, may grasp NLW as an avenue of control and direct military actions that would otherwise not occur. By reducing the probability of death or permanent injury in our "risk adverse" world, NLW may be grasped to response in situations that would have normally gone unanswered. This reasoning, gives the government little credit for common sense. Provided our national leaders are educated on the true capabilities and functions of non-lethal weapons, I believe the administration will comprehend the potential and associated risks of the devices, and implement them properly.

Conflict Employment and Lessons Learned

Non-lethal weapons were used to varying degrees of success in past military operations. Some important lessons learned were garnered from the Gulf War, Somalia, and Bosnia. Each will be discussed below.

The Gulf War was the first time that high-tech non-lethal weapons were used to any great extent. The warheads of some Tomahawk cruise missiles were modified to carry thousands of carbon fiber spools instead of explosives. Detonated over Iraqi power stations, the carbon fibers short-circuited outdoor switching and transformer stations and shut them

down. The action aimed to avoid destroying the generators that would have taken months to repair and caused needless suffering to the civilian population from extended power outages. Regrettably, the power stations were later destroyed with conventional weapons anyway because battle damage assessments could not be verified.³⁴

During Operation RESTORE HOPE in Somalia, shortcomings were revealed in the United States capability to identify and deploy non-lethal military systems. ROE were “based on the standard principle of a graduated response, authorizing the use of ‘minimum force’ necessary to repel attacks or imminent threat of attack, and to ensure the safety of the troops.”³⁵ This sounds fine on the surface, but the ROE assumed a clear-cut distinction between the use of deadly force and all other means of force. Furthermore, it myopically grouped lethal and NLW together.³⁶ This simplistic approach regarded the use of force as a “black or white” alternative rather than as an incremental force continuum (see Figure 2).

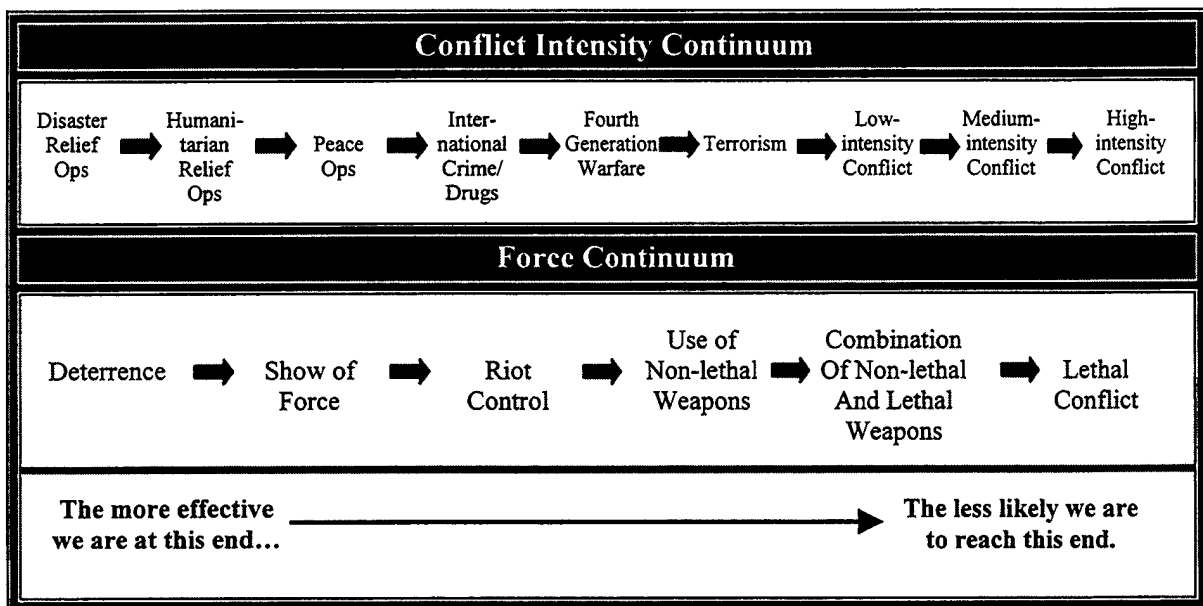


Figure 2³⁷

This arbitrary and unnecessary distinction between deadly force and lesser means restricted NLW to situations where deadly force was authorized and usurped the utility of a less than

lethal weapon.³⁸ If a soldier had to wait until his life was in danger before he could shoot a hostile with a beanbag or rubber pellet, why would he resort to non-lethal means at all?³⁹ As a result, many of the NLW supplied to American forces in Somalia were never used (see Figure 3).

Non-lethal Equipment Acquired For The 13 th MEU(SOC) In Somalia	
<ul style="list-style-type: none"> • Sticky foam • Aqueous foam • 40mm Munitions: <ul style="list-style-type: none"> ○ No. 40B stinger cartridges ○ No. 40W wooden baton rounds ○ No. 2504 Tri-flex beanbag rounds ○ No. 40F foam rubber rounds 	<ul style="list-style-type: none"> • Stinger grenades • Caltrops • 12-Gauge Shotgun Munitions: <ul style="list-style-type: none"> ○ No. 23 beanbag rounds ○ No. 23 rubber pellet cartridges ○ No. 23 wood baton rounds • Oleoresin Capsicum (OC) Aerosol Pepper Projectors Mk4, Mk5, and Mk46

Figure 3⁴⁰

Limitations on the employment of sticky foam in Somalia were also unreasonable. Washington erroneously assumed that the sticky foam would be used as an anti-personnel weapon. Visions of CNN broadcasting pictures of an agitator suffocating, his head covered in a blob of foam, prevented a more careful analysis of the intended use of the product. Sticky foam is very effective as an area denial device—especially when used in concert with other barrier systems such as barricades or barbed wire. Spraying a specific demonstrator is difficult, and unnecessary, when other non-lethal items such as rubber baton rounds can be aimed at the person. “By limiting sticky foam to ‘deadly force’ situations, the ROE effectively precluded its use.”⁴¹

A final anecdote about Somalia: United States Marine Gunnery Sergeant Harry Conde thought he was being attacked when a Somali reached into his vehicle to steal his sunglasses. As the convoy pulled away, Conde fired his weapon and wounded two Somalis

in the process. A military jury convicted him of aggravated assault for using excessive force, ruling that the shooting was not an act of self-defense and was therefore outside operational ROE.⁴² Later in RESTORE HOPE, cayenne pepper spray was provided to soldiers. This helped them bridge the gap between verbal warnings (which usually did not work) and deadly force (which usually was not appropriate). “The spray was so effective that merely waving any aerosol can in the air was said to ward off Somalis by the end of the operation.”⁴³ It became a powerful deterrent because soldiers used it, and Somalis learned that they would. If the pepper sprays were available earlier in the operation, perhaps Gunnery Sergeant Conde would have chosen that option rather than resorting immediately to deadly force.

During Bosnia’s Operation DECISIVE EDGE, large numbers of civilians from one ethnic group violently attempted to apprehend and harm displaced persons and refugees from another ethnic group. The coalition commander felt that firing warning shots into the air was the minimum force necessary to counter the actions of the violent group. It worked, but if the warning shots had failed as a deterrent, the threshold to deadly force would have unavoidably been crossed. De-escalation of the situation at that point would have been very difficult. In any event, unknown collateral damage may have resulted when the rounds fired into the air succumbed to gravity and fell back to earth. With NLW, the commander could have applied force to the rioters without resorting immediately to weapons discharge. It would also have added distance between the soldiers and the crowd—enhancing their security.⁴⁴

Looking Ahead

To triumph in a counterinsurgency and gain legitimacy in peace operations, military forces must win the hearts and minds of the affected population.⁴⁵ To foster this legitimacy,

peacekeepers must adhere to the objectives agreed upon by the international community, ensure their responses are appropriate to the situation, and deal fairly with the various factions. Disciplined armed forces that show restraint and apply prudent and appropriate military capability further reinforce legitimacy. Restraint requires a careful balancing of the need for security, the conduct of operations, and the political objective. Excessive force will antagonize involved parties and damage the legitimacy of the organization that uses it, while possibly enhancing the legitimacy of the opposing side.⁴⁶ Where a government does not exist, extreme caution should be used when dealing with individuals and organizations to avoid inadvertently legitimizing them.⁴⁷

Although there is no "silver bullet" that can resolve all disturbances, non-lethal weapons have potential to fill a crucial niche in the force continuum between doing nothing and killing people. NLW are advantageous because they demonstrate a reverence for life, a proof of civility, and a commitment to the use of minimal force. Capable of delivering a varying level of effects, non-lethal weapons offer commanders a means to ratchet their response level up or down along the force continuum in direct relationship with the intensity of the perceived threat. NLW hold promise as the weapons of choice, particularly when the opponents do not possess excessive destructive capacity.⁴⁸ Besides, arming our forces with incapacitants would minimize collateral damage and noncombatant casualties. As a bonus, foes in custody, rather than in body bags, could furnish valuable intelligence.⁴⁹

With judicious distribution practices, a portion of each peacekeeping unit can be furnished with enough non-lethal weapons to serve their needs without overwhelming the group as a whole. Every soldier, for example, could carry a can of pepper spray on his belt without difficulty. Beyond that, twenty percent or so of the unit would be issued non-lethal

gear. They would serve as the front line of defense under normal circumstances, but could quickly fall back behind their own lines and switch to lethal weapons if the need arose. Furthermore, the cost of non-lethal weapons is low in comparison to much of today's conventional equipment.

To successfully deploy NLW while maintaining legitimacy for the action, careful planning must go into the development of ROE. This preparation must begin as soon as the need to use force against unarmed hostile elements is identified. In this way, decisions that must be made by field forces concerning the appropriate level of force to be applied will be less ambiguous.⁵⁰ Regardless of how simple written rules of engagement may appear to be, the final judgment in time of tension rests on the soldier's ability to apply the rules.

"Commanders at all levels must take proactive steps to ensure their personnel know and understand the rules of engagement and are quickly informed of changes."⁵¹

Non-lethality will require additional thought in the ROE development process, but the benefits are worth the effort. Commanders can tailor the rules and operational procedures to ensure that necessary force, proportionate to the situation and mission, is available and useable. As a result, decisions that must be made by field forces concerning the appropriate level of force to be applied will be less ambiguous.⁵²

The rules of engagement must take into account coalition members operating under the joint command. For example, consider an adolescent who throws a rock at a truck or a checkpoint. United States ROE would probably not consider the act a threat. American soldiers would most likely ignore the event—or squirt the youth with pepper spray if he was close enough. By United States standards, a lethal response for this act is not merited. In stark contrast, the same action in other nations can get a person shot. Coalition ROE must be

carefully crafted and uniformly applied by all members of the team. If foreign coalition members are still predisposed to shooting rock-throwers, thought must be given to moving them to other responsibilities rather than risking disruption to the coalition force—and its subsequent loss of legitimacy.⁵³

With easily understood ROE in place, effort must be given to properly train the military forces that will employ them. Sensationalist media stories could result should NLW be used indiscriminately or result in accidental fatalities. This in turn could undermine the peacekeeping mission. Therefore, a great deal of emphasis must be placed on the education and training of troops to employ these systems to best effect.⁵⁴ Peace operations are generally characterized by restraint in the use of firepower and violence. In contrast, the wartime environment places a premium on aggressiveness once the enemy is identified. Training for non-lethal operations must receive the same emphasis as training for war. However, the immediate “killer response” must be modified, but not abandoned, since the non-lethal tactics can never be used in isolation.⁵⁵

NLW offer a valid function if the alternative to using them is the loss of American lives, but a zero-fatality expectation cannot be established for them. It is essential that military commanders at every level, policymakers, and the American public understand the real capabilities and limitations of NLW so as to avoid conflicting and false expectations.

Conducting peace operations is a recurring mission of the United States military. To carry out this function, the Task Force Commander must be afforded a wide array of alternative response methods to implement in the field. Since non-lethal weapons can be employed at the lower end of the force continuum, the commander can more rapidly counter evolving threat situations, retain the initiative, and reduce the vulnerability of his soldiers.

Moreover, using non-lethal weapons strengthens the legitimacy of the operation by demonstrating United States restraint in the use of deadly force. While deployed overseas, the surrounding population would observe our soldiers operating in a reserved manner and applying only the minimal force necessary to meet their military objective. At the same time, our casualty adverse American public would be more likely to support the peace operation because NLW would reduce the risk of bloodletting. Finally, United States Forces standing side-by-side with UN, NATO, or coalition forces gain an international stamp-of-approval that enhances operational legitimacy through the combined political weight of the action.

APPENDIX 1

Non-lethal Weapons Operational Categories			
Type	Description	Employment Method	Target
<u>Optical munitions</u>			
Uni-directional	Flash-blind personnel.....	Artillery or air-launched.....	AP
Isotropic.....	Flash-blind personnel.....	Artillery or air launched.....	AP
Pulsing Light.....	Disorient personnel.....	Vehicle mounted.....	AP
<u>Acoustic</u>			
Infrasound Beam.....	Disorient. Disrupt people/material structures with low freq/high intensity sound.....	Vehicle mounted.....	AP/AM
Bullet/Pulse.....	Physical force.....	Vehicle mounted.....	AP
High Intensity Sound.....	Disorient people. Disrupt material structures.....	Vehicle mounted.....	AP/AM
<u>Microwave</u>			
Repeat Pulse.....	Disrupt electronic gear.....	Vehicle or airborne.....	AM
Single Pulse/ EMP.....	Short-out power generation equipment, electronic components...	Cruise missiles.....	AM
<u>Biologics</u>			
Bio-deterioration.....	Degrade materials.....	Direct/vehicle-mounted.....	AM
<u>Chemical</u>			
Super Adhesive.....	Produce rapid adhering of materials.	Direct/Artillery/vehicle/aircraft.....	AP/AM
Super Lubricant.....	Anti-traction "slickum".....	Direct/Artillery/vehicle/aircraft.....	AP/AM
Corrosives/Caustic.....	Degrade materials.....	Direct/air-launched.....	AM
Embrittling substances.....	Reduces material's strength.....	Direct/mortar/artillery.....	AM
Vehicle engine modifiers...	Alters fuel combustion to disable engines.....	Direct.....	AM
Odiferous.....	Produce extremely unpleasant odor..	Direct/mortar/artillery/air.....	AP
Pepper spray.....	Produces eye irritation.....	Direct.....	AP
Riot control gases.....	Produces eye/breathing irritation....	Direct/mortar/artillery/air.....	AP
<u>Lasers</u>			
High-energy.....	Destroy optical sensors.....	Vehicle or aircraft-mounted.....	AM
Low-energy.....	Flash-blind people, disable sensors..	Hand-held, vehicle and aircraft mounted.....	AP/AM
Pulsed-chemical.....	Produce high-pressure shock wave...	Vehicle or aircraft-mounted.....	AM
<u>Others</u>			
Entanglers (nets, cables, chains, etc.).....	Trap vehicles/personnel.....	Direct/vehicle mounted.....	AP/AM
Conductive ribbons/wires..	Short-out power generation equipment, electronic components..	Cruise/Guided missiles.....	AM
Conductive Particles.....	Short-out power generation equipment, electronic components..	Cruise/Guided missiles.....	AM
Stun weapons.....	Electrical Stunners.....	Direct.....	AP
Bullets.....	Wooden, rubber, plastic.....	Direct/vehicle mounted.....	AP
Sting weapons.....	Sting balls, grenades, rings, mines..	Small arms, vehicle-mounted.....	AP
Computer viruses.....	Alter or crash programs.....	Direct/Network.....	AP
Deception/PSYOPS.....	Political propaganda.....	Broadcast/Leaflets.....	AP
Obscurants.....	Obscure sensors/vision.....	Vehicle/Aircraft.....	AP/AM
Optical Coatings.....	Painted on optics or windows.....	Direct/Small arms.....	AM

Note: AM: Anti-Material; AP: Anti-Personnel

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NOTES

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² LTG John E. Rhodes, USMC, "Statement," U.S. Congress, Senate, Armed Services Committee, Subcommittee on Emerging Threats and Capabilities, Navy Experimentation and Activities, 20 October 1999, 9.

³ Huly, 9.

⁴ Joint Chiefs of Staff, Joint Tactics, Techniques, and Procedures for Peace Operations, Joint Pub 3-07.3 (Washington, DC: 12 February 1999), vii.

⁵ Joint Chiefs of Staff, Joint Doctrine for Military Operations Other Than War, Joint Pub 3-07 (Washington, DC: 16 June 1995), III-13.

⁶ Ibid.

⁷ John R. Bolton, "Statement," U.S. Congress, House, Committee on International Relations, United States Policy on United Nations Peacekeeping: Case Studies in the Congo, Sierra Leone, Ethiopia-Eritrea, Kosovo and East Timor, 11 October 2000, 3.

⁸ Department of Defense, Policy for Non-Lethal Weapons, Directive 3000.3 (Washington, DC: 9 July 1996), 1.

⁹ LTG Michael J. Williams, USMC, "Statement," U.S. Congress, Senate, Armed Services Committee, Seapower Subcommittee, Navy and Marine Corps Major Seapower Procurement and Research and Development Programs, 23 March 2000, 3.

¹⁰ Joint Chiefs of Staff, Joint Pub 3-07.3, I-4.

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¹² The Harvard Sussex Program, Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, 26 March 1975, <<http://www.fas.harvard.edu/~hsp/1972.html>> [31 December 2000], 2.

¹³ Nick Lewer and Steven Schofield, Non-lethal Weapons: A Fatal Attraction?, (London: Zed Books Ltd, 1997), 89.

¹⁴ The Chemical Weapons Convention Website, "The Chemical Weapons Convention," 23 February 2000, <<http://www.opcw.nl/guide.htm>> [13 January 2001], 4.

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¹⁷ LTC James C. Duncan, USMC, "A Primer on the Employment of Non-lethal Weapons," 1998, <<http://www.web.lexis-nexis.com/universe/document.htm/>> [4 January 2001], 15.

¹⁸ Ajay Singh, "Non-lethal Warfare," n.d., <<http://www.idsa-india.org/an-apr8-1.html/>> [31 December, 2000], 5.

¹⁹ Mike Coyle, "Non-lethal Weapons and Operations: Potential Applications and Practical Limitations," September 14, 1995, <<http://www.ritualabuse.net/mcf/mn163.htm/>> [2 January, 2001], 4.

²⁰ Richard Kokoski, "Non-lethal Weapons: A Case Study Of New Technology Developments," SIPRI Yearbook 1994, (New York: Oxford University Press, 1994), 385.

²¹ Nick Lewer and Steven Schofield, "Non-lethal Weapons for UN Military Operations," International Peacekeeping, (Autumn 1997): 81.

²² Kokoski, 385.

²³ LTC Martin N. Stanton, USA, "Riot Control for the 1990s," Infantry, (January-February 1996): 23.

²⁴ MAJ Joseph W. Cook III, Maj. David P. Fiely, and Maj. Maura T. McGowan, "Non-lethal Weapons: Technologies, Legalities, and Potential Policies," Airpower Journal, (Special Edition 1995): 89.

²⁵ Ibid.

²⁶ Williams, 4.

²⁷ Coyle, 6.

²⁸ Colonel Joseph Siniscalchi, USAF, "Non-lethal Technologies: Implications For Military Strategy," <<http://www.fas.org/man/dod-101/sys/land/docs/occppr03.htm/>> [26 December 2000], 16.

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³² Singh, 1.

³³ Kokoski, 381.

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- ³⁸ Lewer and Schofield, *A Fatal Attraction?*, 79.
- ³⁹ F. M. Lorenz, "Non-lethal Force: The Slippery Slope to War?," Parameters, (Autumn 1996): 57.
- ⁴⁰ Lewer and Schofield, *A Fatal Attraction?*, 69.
- ⁴¹ Lorenz, 6.
- ⁴² Jonathan T. Dworken, "Rules of Engagement, Lessons from RESTORE HOPE," Military Review, (September 1994): 26.
- ⁴³ Ibid.
- ⁴⁴ COL R. R. Romses, RCA, "Peace Support Operations: Time Now for the Canadian Forces to Address a Force Continuum Gap," <<http://www.cfcsc.dnd.ca/irc/amsc/amsc1/033.html>> [31 December 2000], 8.
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- ⁴⁶ Joint Chiefs of Staff, Joint Pub 3-07.3, II-4.
- ⁴⁷ Joint Chiefs of Staff, Joint Pub 3-07, II-4.
- ⁴⁸ Singh, 6.
- ⁴⁹ Coyle, 5.
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- ⁵³ Stanton, "Riot Control for the 1990s," 23.
- ⁵⁴ Romses, 9.
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- ⁵⁶ Lewer and Schofield, *A Fatal Attraction?*, 64.

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